

2. The isolated or purified antibody or fragment thereof of claim 1, wherein CDR L1 is selected from the group consisting of QSLLNSRNQNH (SEQ ID NO:8) and QSLLNSDTQKNF (SEQ ID NO:9).

3. The isolated or purified antibody or fragment thereof of claim 1 or 2, wherein CDR L2 is selected from the group consisting of WAS (SEQ ID NO:36) and FAS (SEQ ID NO:37).

4. The isolated or purified antibody or fragment thereof of any one of claims 1 to 3, wherein CDR L3 is selected from the group consisting of QQYYTYRT (SEQ ID NO:10) wherein X is P or no amino acid; and QQYYSIPLT (SEQ ID NO:11).

5. The isolated or purified antibody or fragment thereof of any one of claims 1 to 4, wherein CDR H1 is selected from the group consisting of GYSITSDYY (SEQ ID NO:12) and GYTFTDYY (SEQ ID NO:13).

6. The isolated or purified antibody or fragment thereof of any one of claims 1 to 5, wherein the antibody or fragment thereof is selected from the group consisting of:

a) a light chain comprising CDR L1 of sequence QSLLNSRNQKNH (SEQ ID NO:8), CDR L2 of sequence WAS (SEQ ID NO:36), and CDR L3 of sequence QQYYTYRT (SEQ ID NO:14); and a heavy chain comprising CDR H1 of sequence GYSITSDYY (SEQ ID NO:12), CDR H2 of sequence IGYDGSK (SEQ ID NO:15), and CDR H3 of sequence TRDRANWDYFDY (SEQ ID NO:6);

b) a light chain comprising CDR L1 of sequence QSLLNSRNQKNH (SEQ ID NO:8), CDR L2 of sequence WAS (SEQ ID NO:36), and CDR L3 of sequence QQYYTYRT (SEQ ID NO:14); and a heavy chain comprising CDR H1 of sequence GYSITSDYY (SEQ ID NO:12), CDR H2 of sequence IGYDGTK (SEQ ID NO:16), and CDR H3 of sequence TRDRANWDYFDY (SEQ ID NO:6); and

c) a light chain comprising CDR L1 of sequence QSLLNSDTQKNF (SEQ ID NO:9), CDR L2 of sequence FAS (SEQ ID NO:37), CDRL3 of sequence QQYYSIPLT (SEQ ID NO:11); and a heavy chain comprising CDR H1 of sequence GYTFTDYY (SEQ ID NO:13), CDR H2 of sequence IYPGNIGHT (SEQ ID NO:5), and CDR H3 of sequence AYDLFNY (SEQ ID NO:7).

7. The isolated or purified antibody or fragment thereof of any one of claims 1 to 6, wherein the variable light (VL) domain comprises the sequence:

DIVMX<sub>1</sub>QSPSSLAX<sub>2</sub>SVGX<sub>3</sub>KVTMSCKSSQSLLNSX<sub>4</sub>X<sub>5</sub>QKNX<sub>6</sub>LAWYQQKPGQS  
PKX<sub>7</sub>LX<sub>8</sub>YX<sub>9</sub>ASTX<sub>10</sub>ESGVPDRFX<sub>11</sub>GX<sub>12</sub>GSGTD  
FILTIX<sub>13</sub>SVX<sub>14</sub>AEDLAX<sub>15</sub>YX<sub>16</sub>C  
QQYYX<sub>17</sub>X<sub>18</sub>X<sub>19</sub>X<sub>20</sub>TFGX<sub>21</sub>GTKLEIK (SEQ ID NO:17) where X<sub>1</sub>=S or T, X<sub>2</sub>=V or M, X<sub>3</sub>=E or O, X<sub>4</sub>=R or D, X<sub>5</sub>=N or T, X<sub>6</sub>=H or F, X<sub>7</sub>=L or I, X<sub>8</sub>=I or V, X<sub>9</sub>=W or F, X<sub>10</sub>=R or K, X<sub>11</sub>=S or I, X<sub>12</sub>=D or S, X<sub>13</sub>=S or T, X<sub>14</sub>=K or Q, X<sub>15</sub>=V or D, X<sub>16</sub>=Y or F, X<sub>17</sub>=T or S, X<sub>18</sub>=Y or I, X<sub>19</sub>=P or no amino acid, X<sub>20</sub>=R or L, X<sub>21</sub>=G or A.

8. The isolated or purified antibody or fragment thereof of claim 7, wherein the variable light (VL) domain comprises a sequence selected from the group consisting of:

DIVMSQSPSSLAVSVGKVTMSCKSSQSLLNSRNQKNHLAWYQQKPGQSPK  
LIYWASTRESGVPDFRFX<sub>1</sub>GDGSQGTDFTLTISSVKA  
EDLAVYYCQQYYTYRTFGG GTKLEIK (SEQ ID NO:18) where X<sub>1</sub>=S or T; and

DIVMTQSPSSLAMSVGQKVTMSCCKSSQSLLNS-DTQKNFLAWYQQKPGQSPK  
VYFASTKES-GVPDRFIGSGSGTDFTLITTSVQAEDLADYFC  
QYQYIPLTFGAGT KLELK (SEQ ID NO:19).

9. The isolated or purified antibody or fragment thereof of any one of claims 1 to 8, wherein the variable heavy (VH) domain comprises a sequence selected from the group consisting of:

DVQLQESGPGLVKPSQSLSLTCVTGYSITSVDYY-  
WNWIRQFPGNKLEWMAYIG  
YDGX<sub>1</sub>KNYNPNSLKNRISITRDTSKNQFFLKLNSV  
TTDDATYYCTRDRANWDDY FDYWGQGTTLT-  
VSS (SEQ ID NO:20) X<sub>1</sub>=S or T; and  
QIQLQQSGPELVKPGAPVKISCKASGYTFTDYYIH-  
WVNQRPGQGLEWIGYIYPG NGHTVYNQKFK-  
VRATLTADNPSSAYLQLNSLTSEDSGVYFCAY-  
DLFNYWGQ GTLTVSA (SEQ ID NO:21).

10. The isolated or purified antibody or fragment thereof of any one of claims 1 to 9, wherein the isolated or purified antibody or fragment thereof comprises a sequence selected from the group consisting of

a) a variable light (V<sub>L</sub>) domain of sequence:

(SEQ ID NO: 22)  
DIVMSQSPSSLAVSVGKVTMSCKSSQSLLNSRNQKNHLAWYQQKPGQSP  
KLLIYWASTRESGVPDFRGDGSGTDFTLTISSVKAEDLAVYYCQQYYTY  
RTFGGGTKLEIK;

and variable heavy (V<sub>H</sub>) domain of sequence:

(SEQ ID NO: 24)  
DVQLQESGPGLVKPSQSLSLTCVTGYSITSVDYYWNWIRQFPGNKLEWMA  
YIGYDGSKNYPNSLKNRISITRDTSKNQFFLKLNSVTTDDATYYCTRDR  
ANWDDYFDYWGQGTTLVSS;

b) a variable light (V<sub>L</sub>) domain of sequence:

(SEQ ID NO: 23)  
DIVMSQSPSSLAVSVGKVTMSCKSSQSLLNSRNQKNHLAWYQQKPGQSP  
KLLIYWASTRESGVPDFRGDGSGTDFTLTISSVKAEDLAVYYCQQYYTY  
RTFGGGTKLEIK;

and variable heavy (V<sub>H</sub>) domain of sequence:

(SEQ ID NO: 25)  
DVQLQESGPGLVKPSQSLSLTCVTGYSITSVDYYWNWIRQFPGNKLEWMA  
YIGYDGSKNYPNSLKNRISITRDTSKNQFFLKLNSVTTDDATYYCTRDR  
ANWDDYFDYWGQGTTLVSS;

c) a variable light (V<sub>L</sub>) domain of sequence:

(SEQ ID NO: 19)  
DIVMTQSPSSLAMSVGQKVTMSCCKSSQSLLNSDTQKNFLAWYQQKPGQSP  
KILVYFASTKES-GVPDRFIGSGSGTDFTLITTSVQAEDLADYFC  
QYQYIPLTFGAGT KLELK;